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Maine Agricultural Experiment Station

ORONO

BULLETIN No. 213

JUNE, 1913

APHID PESTS OF MAINE II. WILLOW FAMILY

CONTENTS.

This bulletin contains a descriptive account of Maine aphides infesting the plants of the willow family, accompanied by a list of aphides recorded from other parts of the world on the corresponding plants. Three species are described as new.

Remedial measures are discussed on pages 91 and 92.

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BULLETIN No. 213.

APHID PESTS OF MAINE. PART II.*

EDITH M. PATCH.

WILLOW FAMILY.

It is interesting to note that the aphides attacking willows and poplars are restricted to comparatively few genera. Many of the species are troublesome on shade and ornamental trees. The complete life cycle of certain gall forming species of the poplar is not yet known, but with *Pemphigus betae* (Gillette 1912) traced to the cottonwood for its winter host we have a stimulus for ascertaining whether the poplar serves as alternate host for other species of economic importance to vegetation outside of the willow family itself.

***Pemphigus populimonilis* Riley.** The galls of this species are so familiar and characteristic with their bead like rows of cells each containing a single occupant, that *populimonilis* has been free from synonymic difficulties. Fig. 47.



Fig. 20. *P. populimonilis*. Antenna of spring migrant.

Fig. 21. Antenna of pupa drawn to same scale as Fig. 20.

* Papers from the Maine Agricultural Experiment Station: Entomology No. 65.

Alate viviparous female,—*Spring migrant*. From late July until mid-August this form can be found winged and solitary in the gall which it is now ready to desert. Fig. 20 shows the antenna of this form and Fig. 46 D. the wing. Fig. 21 is a drawing of the antenna of the pupa, the joints IV and V of which are typically rather short and bulging, and VI longer, narrower and with nearly parallel margins.

Apterous viviparous female,—*Stem mother*. This form has not previously been recorded. I first took it in 1905 and have met with it since though the galls of the progeny so far outnumber those of the stem mother that many occur to one containing the apterous parent. Sometimes the stem mother is present in one of a chain of galls containing pupae, but often she is found in a single gall separate from those occurring in a chain but not differing from them in structure or appearance,—at least there is not enough difference so that those containing the stem mother can readily be separated without examining the insect itself.

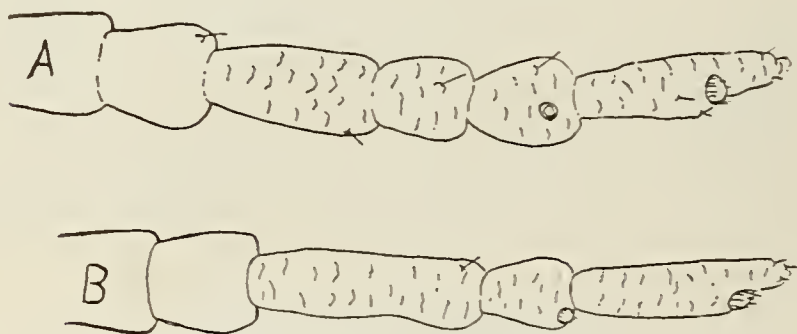


Fig. 22. *P. populimonilis*. Antenna of stem-mother.

The antenna of this form (Fig. 22) is ordinarily 6-jointed though sometimes, as is often the case with stem mothers of allied species, there is some irregularity in the development of the antenna and it appears with 5 joints. The joints have the same rotundity as in the pupa, a character accentuated by the shortness of IV and V which are literally about as broad as they are long.

Collection data for this species are as follows: 46-05. *Populus balsamifera*. Aug. 15. 1905. Veazie, Me. Several stem mothers taken singly in galls but these were dead either from

parasitic insect or fungous attack. Winged form and pupæ were present in other galls, and a species of *Chaitophorus* was populating galls deserted by this *Pemphigus*.

86-06. *Populus balsamifera*. July 26, 1906. Veazie, Me. A single winged specimen in each small gall except where the gall was already vacated or occupied by a syrphus maggot.

81-09. *Populus balsamifera*. July 22-27, 1909. Veazie, Me. Galls very numerous. A single leaf was found bearing 65 galls. Four stem mothers, numerous pupæ and winged migrants still in galls,—each solitary.

99-12. *Populus balsamifera*. July 18, 1912. Veazie, Me. Galls numerous each containing a single insect in pupal stage.

***Pemphigus gravicornis* n. sp.** For the past three years the pseudo-galls of this species have been common on *Populus balsamifera*. The affected leaves are folded lengthwise along the midrib and their margins are applied together at their ventral surfaces. The whole leaf except at the margin is swollen into a large sac or pocket which is filled with aphides. Fig. 53. This gall resembles that of *populiconduplifolii* but the two aphides are readily separated on antennal characters. So far as my observations go the galls of *gravicornis* occur on leaves anywhere on the tree while those of *populiconduplifolii* are on terminal leaves only.

Winged viviparous form.—*Spring migrant*, with antennal joints III, IV, V heavily charged with large irregular sensoria giving them a knurled appearance; and VI very slender and ordinarily without sensoria except the usual one at base of spur, though one or more others may be present. Fig. 23.

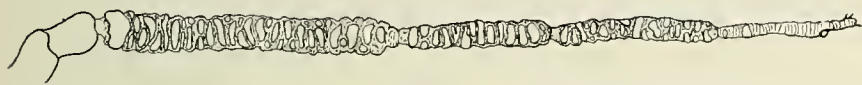


Fig. 23. *P. gravicornis*. Antenna of spring migrant.

The wings are delicate and the veins faint. Fig. 46 H. No description has been made of the living specimens, but the peculiar antennæ will serve to distinguish this species.

Collection data are as follows:

87-06 July 26, 1906. Veazie, Me.; 26-11 July 7, 1911, Orono, Me.; 98-12 July 18, 1912, Veazie, Me. Pupæ and migrants

were taken but no stem mothers in these collections. The deserted galls are frequently appropriated by colonies of *Chaitophorus*.

***Pemphigus populiconduplifolius* Cowen.** The galls of this species resembles that of *gravicornis* closely. Fig. 52. Sometimes galls of this species instead of being folded along the midrib are all on one side of the midrib in which case they are elevated above the level of the surface, and like those of *gravicornis* the ventral surface of the leaves forms the inside of the gall. Galls are pale green tinged with red and have a swollen appearance. The terminal leaves are those ordinarily attacked.

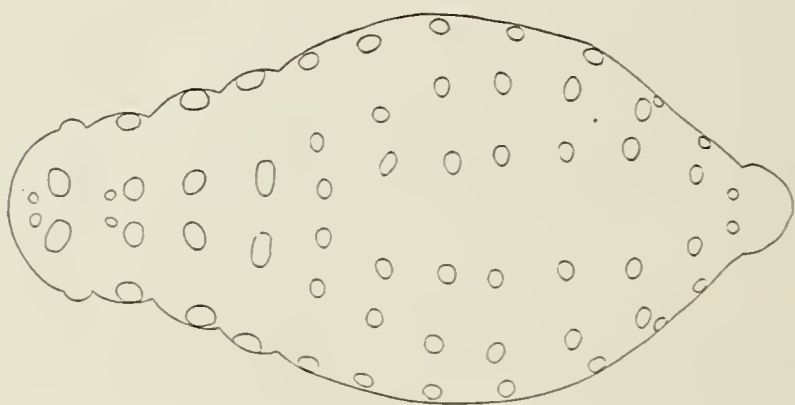


Fig. 24. *P. populiconduplifolius*. Wax gland areas of stem-mother.

Apterous viviparous female.—Stem mother. The wax gland areas of this form are shown in Fig. 24 and the antenna in Fig. 26. This insect is globular, dark greenish blue and woolly.

Winged viviparous form.—spring migrant. The antenna of this form is shown in Fig. 25 and the wing in Fig. 46 c.

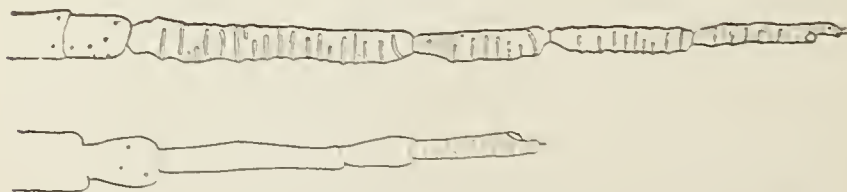


Fig. 25. *P. populiconduplifolius*. Antenna of spring migrant.

Fig. 26. Antenna of stem-mother.

Collection data are as follows:—23-06 (in part) June 14, 1906. Stem mothers; 37-10 June 29, 1910, Veazie, Me. Pupæ numerous and some migrants just winging; 46-10, 47-10, July 5, 1910, Veazie. One stem mother and numerous pupæ and winged forms. 91-12, a single stem mother in each gall with several nymphs, Orono Campus. 110-12, July 15, 1912, Orono, same tree as 91-12 and probably some of the same lot. Winged forms numerous. *Populus balsamifera*.

Pemphigus populicaulis Fitch. This species is structurally very close to *bursarius*. A few of the galls are shown in Figs. 49, 50, and 51. As will be noticed these are formed near the midrib and may be at the base of the leaf or elsewhere along the midrib, the opening being sometimes on the ventral (Fig. 49) and sometimes on the dorsal surface (Fig. 51). The galls vary considerably in size and in shape though they are more or less globular. This species is common on *Populus balsamifera* in this vicinity.

Winged viviparous female,—spring migrant. The wing of this form is shown in Fig. 46 I. and the antenna in Fig. 27. It will be noticed that joint VI is as heavily annulated as the other joints. I have specimens from Minnesota and Texas which accord with the Maine material and the figures of California specimens (Essig 1912) show the same characters as typical.

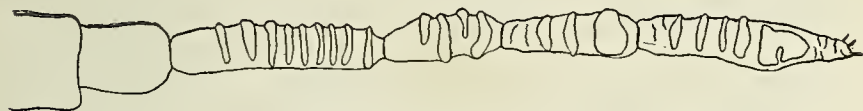


Fig. 27. *P. populicaulis*. Antenna of spring migrant.

Collection data are as follows:—23-11, Orono, July 6, 1911. Winged forms in galls.

101-12, July 18, 1912, Veazie. Galls on stem at base of leaf (Fig. 50) causing a twist in the stem. Opening on the ventral side. Galls are more or less pinkish and some are decidedly reddish.

102-12 Veazie, July 18, 1912, galls on ventral side of leaf opening on dorsal surface, greenish or occasionally pinkish. They measured from half an inch to three-quarters of an inch along the mid-rib. Fig. 51.

103-12, Veazie, July 18, 1912. Pinkish galls along the mid-rib on the dorsal side opening on the ventral surface. Fig. 49.

Pemphigus bursarius Linn? A species closely allied to, if not identical with *bursarius* of Europe (Tullgren 1909) is common on poplar here. The life cycle is not ascertained but breeding tests for an alternate host are planned. The antenna and wing are represented by figures 28 and 46 B.

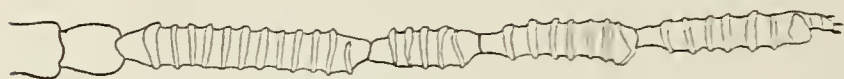


Fig. 28. *P. bursarius*. Antenna of spring migrant.

The gall is found on the petiole of the leaf in the form of irregular swellings of varied size, anywhere from near the base of the leaf to the extreme proximal end of the petiole. Gall causes curve in the petiole or sometimes a confused twist where two or three galls are crowded close together. Galls are also sometimes found on the new growth twig itself. The opening is a rather lip like slit usually transverse to the petiole. Fig. 48.

Collection data are as follows:—

60-06. and 65-10, July 7 and 10, 1906. Irregular globular galls on petiole containing winged forms and pupæ.

64-06, July 10, 1906. Irregular globular galls on new growth twigs of *Populus*.

28-11, Orono Campus. *Populus deltoides* Marsh (var. Carolina poplar) July 12, 1911. Galls contained stem mother, small nymphs, pupæ and winged migrants.

Chaitophorus populicola Thomas. This well marked species does not seem to be confused with other American species either in our literature or collections. Common in Maine on Cottonwood, American Aspen (*P. tremuloides*) and Balsam Poplar (*P. balsamifera*).

Alate viviparous form. General color a varnished black. Antenna black with III paler. Sensoria as shown in figure 29. Abdomen black, hirsute with cornicles yellow. Wing veins black and heavily shadowed, shadow broader at tip of veins especially with the two discoidals where it broadens to a dark V. Fig. 46 K.

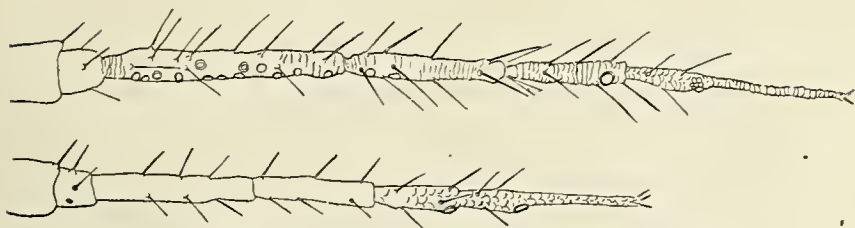
Fig. 29. *C. populicola*. Antenna of alate female.

Fig. 30. Antenna of apterous female.

Apterous viviparous form. Head and antenna black with III pale. Abdomen black dorsally and highly polished, ventral side paler and brownish. Cornicles light almost white. The progeny of these are reddish brown with a distinct yellowish Λ , the stem of which extends to front of head, the fork coming on the abdomen and being much more distinct than the stem. Another yellow spot at caudal part of abdomen, and cornicles are very pale. Body mottled with black specks. Antenna brownish with III pale. Fig. 30. Legs brown.

Collection data as follows:—

47-04, Orono, June 23, 1904. Dark apterous females and nymphs on Aspen Poplar.

47-05, Veazie, Aug. 15, 1905. Balsam Poplar.

33-06, June 18, 1906. Both winged and apterous viviparous females on Balsam Poplar.

59-06, July 3, 1906. Both apterous and winged viviparous females and pupæ on Aspen Poplar.

93-06, August 3, 1906. Both apterous and winged viviparous females on Aspen Poplar.

13-08, June 19, 1908. Veazie. Winged and apterous viviparous females, pupæ and nymphs on leaves and tender shoots of Balsam Poplar.

39-08, Veazie, July 10, 1908. Winged viviparous females and nymphs on leaves and tender shoots of Balsam Poplar.

40-10, Veazie, June 29, 1910. Winged viviparous female and her progeny on ventral side of Balsam Poplar leaf.

41-10, Veazie, June 29, 1910. Winged and apterous females and nymphs on Aspen Poplar.

56-10, Orono, July 12, 1910. Winged and apterous females and nymphs on Balsam Poplar.

70-10. Veazie. July 21, 1910. On leaves and petioles. Apterous females very dark.—some entirely black except for a yellow mark on cephalic portion of abdomen and whitish yellow cornicles.—others yellowish brown as usual. Newly dropped nymphs orange yellow. Winged forms also present.

71-10. Veazie, July 21, 1910. On leaves and petioles of Aspen Poplar. Alate females and small dark apterous females.

5-11. Orono, July 14, 1911. On petioles and new growth twigs of cottonwood. Alate viviparous female.

96-12. Veazie, July 18, 1912. Apterous and alate females. on Balsam Poplar leaves and also in galls of *Pemphigus gravis-cornis*.

Chaitophorus delicata n. sp. A tiny species which I had not seen before and which appears to be undescribed was collected from the leaf of Aspen Poplar (*P. tremuloides*) by Mr. William C. Woods last summer.

The apterous females, nymphs and pupæ, were all a pellucid water white with a vivid green mark on prothorax, a transverse green stripe on first abdominal segment, and a green blotch in the region of the white cornicles more or less connecting them. Fig. 31 shows the relative length of the antennal joints.



Fig. 31. *C. delicata*. Antenna of apterous female.

No winged forms were obtained.

Collection data as follows:—

104-12. Veazie, July 18, 1912. Leaf of Aspen Poplar. A small collection of apterous females, nymphs and pupæ.

119-12. Orono, July 29, 1912. A small collection from ventral leaf of Aspen Poplar. Apterous females, nymphs and one pupa.

Chaitophorus viminalis Monell? Until the life cycle of this species with careful detailed descriptions of the successive generations has been worked out by some one I refrain from definitely attributing Maine collections to either *viminalis* or *nigrac* as at present I am too much confused to contribute any aid to the situation. What I take to be *viminalis* has two successive generations of apterous forms which are so different

in appearance that they might easily be mistaken for two distinct species and it would not be strange if this aphid has already been described under several names.

My color notes on collection 30-06, Veazie, June 15, 1906, *Salix* may be of interest in this connection. The apterous viviparous female had dorsal surface blackish with single well defined yellowish green streak extending from front of head to style,—streak very narrow through head but broadening in the central surface of body to an ovate space, narrowing again toward tip of abdomen. Cornicles yellow, style yellowish green, whole ventral surface greenish yellow. The apterous aphides that the form just described give birth to are uniform pale yellowish green with two vivid green longitudinal lines on the abdomen.

The alate viviparous females of this species present at the same date (June 15) have head and thorax black and abdomen black with greenish yellow lateral margin, cornicles dark, ventral abdomen greenish yellow. The wing (Fig. 46 E) is uniformly smoky dark with slender brown veins and brown stigma. For antennæ see Figs. 32 and 33.

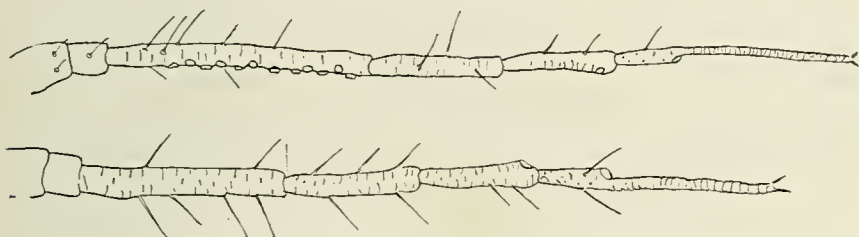


Fig. 32. *C. viminalis*. Antenna of alate female.

Fig. 33. Antenna of apterous female.

There are other species of *Chaitophorus* on *Salix* in Maine but my notes are not sufficient to record.

Aphis salicicola Thomas. I have taken only twice. It is characterized by long cylindrical cornicles, a style proportionately long, and the short branch of Media (Fig. 46 L). The relative length of the antennal segments are shown in Fig. 34. Antennal III has a single row of about seven rather faint sensoria. Fig. 35 shows the cornicle drawn to the same scale as the antenna.

36-04. Apterous and alate viviparous females collected from *Salix*, Orono, June 14, 1904.

88-12. Apterous viviparous females, *Salix*, Orono, July 16, 1912.

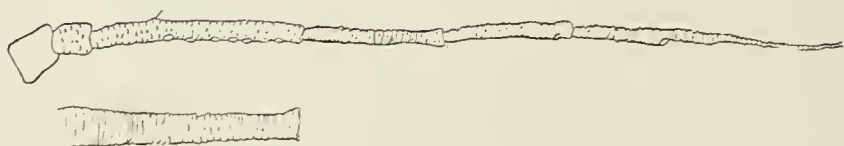


Fig. 34. *A. salicicola*. Antenna of alate female.

Fig. 35. Cornicle of same.

***Aphis populifoliae* Davis.** Speckled Poplar Aphid. This remarkable species found usually on the upper surface of poplar leaves was described by Mr. Davis under the name of *Aphis populifoliae* (Fitch) in June, Econ. Ent. Vol. 3, 1910. p. 489.

The alate viviparous female has the following characters. Head black; no frontal tubercles; antenna with from about 20 to 30 sensoria on III, and few or none on IV relative length of joints shown in Fig. 36; eyes black; beak black, extends to between 2nd and 3rd coxæ; prothorax black, lateral tubercles prominent; shape and venation of wings as usual for *Macrosiphum*, Fig. 46 G, veins and stigma black; legs with femora black, tibiæ pale proximal 2-3 and black distal 1-3, tarsi black; abdomen black or reddish black with snow white pulverulent spots on dorsum arranged in transverse rows of one row per segment, venter slightly powdered; cornicles long cylindrical slightly swollen near base and black; style ensiform and upturned.

The apterous viviparous female is in general appearance black spotted with white. Head black, antenna (Fig. 38) black except proximal III which is very pale; sensoria present on III; eyes black; prothorax black with 2 white dorsal dots, tubercles present; thorax brownish black; legs with femora mostly dark proximally pale, tibiæ mostly pale, distally dark, tarsi black; abdomen brownish black with white pulverulent spots and venter pulverulent; cornicles long, black, cylindrical, slightly swollen near base. Fig. 39 shows cornicle drawn to the same scale as Fig. 38.

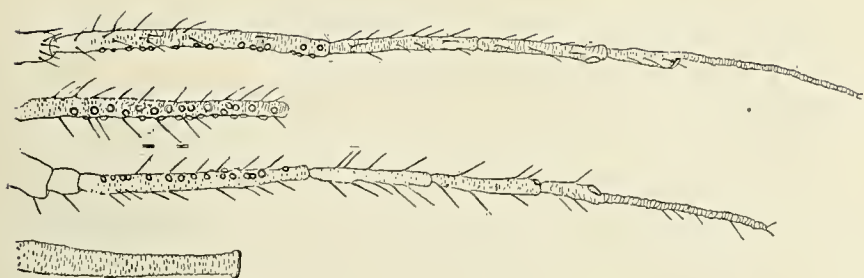


Fig. 36. *A. populifoliae*. Antenna of alate female. Fig. 37. Joint III of same from another individual. Fig. 38. Antenna of apterous female. Fig. 39. Cornicle of same.

Habitat of this species on new growth twigs but especially on dorsal surface of leaves causing a slight longitudinal curl upward. Found on *Populus balsamifera*, *P. tremuloides*, and certain other species of *Populus*.

Collection data: 58-06. One apterous viviparous female with progeny on dorsal leaf. Two alate viviparous females with progeny on dorsal leaves. *Populus balsamifera* and *P. tremuloides* July 3, 1906.

20-08. Apterous viviparous females and progeny. *Populus* sp. Orono, June 22, 1908.

36-08. A mass of this black and white species with a black and white larva of a lady beetle made one of the prettiest "coloration" schemes I have ever seen. *Populus* sp. terminal leaves and tender shoots. Orono, July 9, 1908.

70-08. Winged viviparous female and pupæ on balsam poplar (tender growth of water sprout). Orono, Aug. 25, 1908.

58-10. Apterous viviparous females and progeny on dorsal surface of leaves of *Populus balsamifera* causing a very slight upward curl of leaf. Orono, river bank, July 12, 1910.

77-10. Apterous and alate viviparous females, nymphs and pupæ on *P. balsamifera* on dorsal surface of leaves causing slight curl upward. Orono, river bank, July 23, 1910.

95-12. Apterous and alate viviparous females and nymphs on dorsal surface of leaves of balsam poplar turning the edges of edge and more or less crumple. Also present in galls of *Pemphigus gravicornis*, Veazie Sand Bank, July 18, 1912.

106-12. Alate and apterous viviparous females and nymphs

on dorsal surface of leaves of balsam poplar turning the edges slightly upward. Veazie, July 18, 1912.

Macrosiphum laevigatae Essig. In 1910 a colony of *Macrosiphum* was collected on the campus here at Orono since described from California as *laevigatae*. They were found on the ventral side of the tender tip leaves of willows at the rear of campus heating plant. Only apterous viviparous females and nymphs were taken that season, collection 78-10, but July 16, 1912, winged forms were found on *Salix* at Orono, collection 87-12.

The apterous viviparous female has a light greenish yellow head; antennæ (Fig. 40) with I, II, and III except articulation pale, and IV-VI black, III with 3 to 5 inconspicuous sensoria near base; eyes black, thorax, abdomen almost white with greenish yellow tinge and with a vivid green longitudinal line extending from prothorax to the fifth or sixth segment of abdomen where it sometimes stops abruptly; cornicles longer than antennal III, concolorous at base and dusky at tip which is distinctly though irregularly reticulated for a distance equaling about one-ninth the length of cornicle, the basal eight-ninths being comparatively smooth (Fig. 42); style concolorous with abdomen. There is a minute lateral abdominal tubercle just cephalad the base of the cornicle.

The winged viviparous female has about 10 delicate sensoria on basal half of antennal III. Fig. 41, drawn to the same scale as Fig. 42.

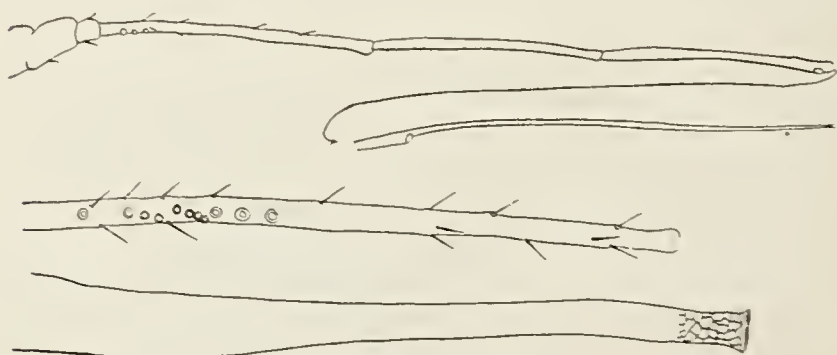


Fig. 40. *M. laevigatae*. Antenna of apterous female. Fig. 41. Joint III of antenna of alate female. Fig. 42. Cornicle of apterous female.

Melanoxantherium bicolor Oestlund. A species which I take to be *bicolor* is not uncommon here on Balsam Poplar.

Apterous viviparous female. Head reddish brown. Eyes black. Antenna with proximal part dingy yellow and distal part black. Spur much longer than basal VI. Prothorax and thorax reddish brown, lateral tubercles prominent. Fig. 44 A. Legs with femora dingy yellow and tibiae and tarsi black. Abdomen dark mottled reddish brown with pale inconspicuous median dorsal line, lateral tubercles prominent. Cornicles light dingy yellow like femora and longer and more slender than in *smithiae*. (51-10). Pupa colored like the apterous female.

Alate viviparous female. Head reddish brown. Antenna (Fig. 43) with spur much longer than basal VI. Prothorax reddish brown, lateral tubercles prominent, Fig. 44 A. Thorax reddish brown. Wings with pale slender veins and light brown stigma. Legs with brownish yellow femora and tibiae tipped with black, tarsi black. Abdomen reddish brown, cornicles light, dull brownish yellow. Fig. 45 A. Only a slight indication of a median dorsal line toward tip of abdomen. The young progeny of this form have a median grayish dorsal line the whole length of the body. (34-06).

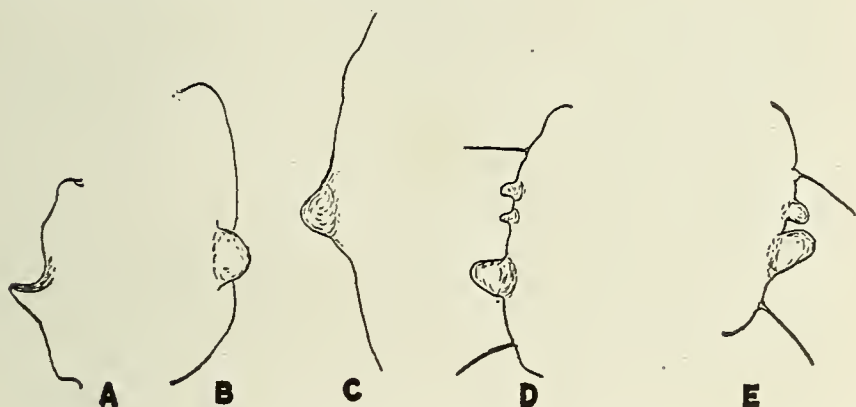


Fig. 44. *Melanoxantherium*. Prothoracic tubercles all drawn to the same scale. A, *bicolor*, apterous viviparous; B, *saliciti*, alate viviparous; C, *smithiae*, alate viviparous; D and E, *salicis*, apterous viviparous.

Collection data:—4-04 (in part). Orono, May 26, 1904. Winged specimens of both this species and *smithiae* were fairly abundant resting on the upper side of cultivated currant leaves.

They had probably merely alighted there as a resting place as no nymphs were present. The currants were not adjacent to willows, though willows were not far distant.

34-06, Veazie, June 19, 1906. Winged form on *Populus balsamifera*.

51-10, Veazie, July 7, 1910. Balsam Poplar. Apterous and alate females and pupæ.

Melanoxantherium salicti Harris. A species which I have taken for *salicti* was collected in Maine on willow in 1906. Head slaty black, not glistening. antenna black except at base. III with about 22 sensoria irregularly placed (Fig. 43. B.). Eyes black. Prothorax black. lateral tubercles present. Fig. 44, B. Thorax black with scutel lobe brownish. wings hyaline with pale brown veins and stigma the color of veins. legs with femora bright yellow, tibiae yellowish with dark distal tip. tarsi black. Abdomen black with bright yellow cornicles which are shaped much as in the foregoing species. (Fig. 45 B.).

Predominating color slate-black with orange yellow legs and cornicles. There is the faintest suggestion of a light mid-dorsal line. (25-06). Orono, June 16, 1906. Willow twig.

Nymphs (half grown progeny of foregoing). Predominating color dark reddish brown with conspicuous median dorsal line of grayish white extending from front of head to cauda. Ventral surface slightly powdery gray. Antenna light. clear. with distal end dark. Legs with femora light clear. slightly yellowish, tibiae dusky. and tarsi black. Cornicles yellow. 26-06. Orono, June 16, 1906. Willow twig.

Melanoxantherium smithiae Monell. A dusky reddish species with hyaline wings, and pale pulverulent longitudinal median line on abdomen, cornicles orange, shorter and more bulging than in the three species preceding, accords with named specimens of *smithiae* kindly given me by Mr. Monell. Figs. 43 C, 44 C and 45 C. D. On *Populus*, migrating to *Salix* early in June.

Collection data for this species are as follows:

4-04 (in part). Mixed collection of *bicolor* and *smithiae*. Winged forms resting on cultivated currant (probably alighted there temporarily only). Twelve taken in one hour. No progeny present. May 26, 1904. Orono.

15-04. Winged females. Willow. May 26, 1904. Orono.

66-04 and 67-04. Heavy infestation of winged and apterous females on willow in front of Experiment Station Building Sept. 9, 1904. This species proved such an annoyance to people using the building that the willows were removed.

6-07. Specimens received from Caribou, Maine, June 17, 1907, with the complaint that "they cover a limb and suck the bark until it is dead and peels off." On Carolina Poplars and Aspen trees.

64-10. Apterous viviparous females and nymphs on *Salix*, near Campus Greenhouse, new growth twig, Orono, July 18-25, 1910.

95-10. Apterous viviparous females and nymphs numerous along *Salix* stem. Orono, Aug. 18, 1910.

126-10. Winged and apterous viviparous females numerous on same willows from which 64-10 were collected. Sept. 15, 1910.

26-13. Orono *Populus*. June 2, 1913. Pupæ, and migrants ready for flight.

35-13. Orono, June 5, 1913. *Salix*. Migrants occurring singly with young.

Melanoxantherium antennatum n. sp. This remarkable species I have not met since 1908, and only the apterous oviparous females were seen at that time. However, this form is so distinctive it seems unnecessary to wait longer for the winged forms before presenting a brief description.

The apterous oviparous female has a blackish head with black eyes; antenna blackish and with but 4 joints, III with single terminal circular sensorium; (Fig. 43 D) prothorax greenish brown; tubercle lacking or inconspicuous; entire leg black; abdomen hirsute; incrassate clavate cornicles black upon a yellow spot; (Fig. 45 E) dorsal surface of body with a general dark greenish brown coat or blackish; ventral surface greenish yellow. Ventro-lateral margin of abdomen with the appearance of a longitudinal roll.

103-08. Apterous oviparous females and eggs received from E. No. Yarmouth, Maine, Oct. 31, 1908, with the statement "we find a great many of these insects on and in a pump which stands beneath an old willow."

104-08. Apterous oviparous females received from Cherryfield, Maine, Nov. 4, 1908.

Melanoxantherium salicis Linn. This black bodied aphid with conspicuous white spots, brilliant cornicles and heavily veined wings is a striking contrast to the allied but more subdued species of this genus.

Alate viviparous female. Head blackish; antenna (Fig. 43 E) with I, II, III brown, others blackish. III with about 14 sensoria in irregular row, base and spur of VI subequal; eyes black; prothorax blackish with prominent lateral tubercle; thorax with lobes all uniform black; wings with very heavy black veins, anal vein heaviest; legs with femora and tibiæ brown with points dark, tarsi black; abdomen greenish or brownish black with white median line composed of dots and with 4 white spots cephalad the cornicles in a row bordered by smaller ones and a large white spot at base caudad of cornicle; cornicles brilliant orange, long large bulging and with very little flare at opening, about as in the apterous form.

The young progeny of the alate viviparous females are dull greenish with bright orange cornicles and white markings arranged as in the parent.

Apterous viviparous female. The antenna (Fig. 43 F) with sensoria on III, but fewer than in the alate form. The cornicles are bright orange, long, large, bulging, constricted at tip with a very slight flare. (Fig. 45 F). The lateral tubercles of prothorax and abdomen are very large and conspicuous. In Maine collections the number and arrangement of those on the prothorax seem subject to variation. There is always one large prominent one but one or two others may be present. (Fig. 44 D and 44 E).

Collection data: 49-06. June 28, 1906. Alate viviparous females and nymphs on *Salix* along branches more than 1-4 inch in diameter.

8-08. Orono, June 16, 1908, on trunks and branches of *Salix* in gregarious colonies.

12-10. May 16, 1910. Gregarious along stem of *Salix*, Orono. Apterous viviparous females just mature not yet with progeny. Body black, cornicles bright orange.

16-10. May 18, 1910. Nymphs. First instar with 4-jointed antennæ and beak reaching beyond tip of abdomen. Second instar with 4-jointed antenna and beak extending beyond 3rd coxa. Third instar with 5-jointed antenna. June 6, winged

forms rapidly developing from colonies near base of main willow trunk.

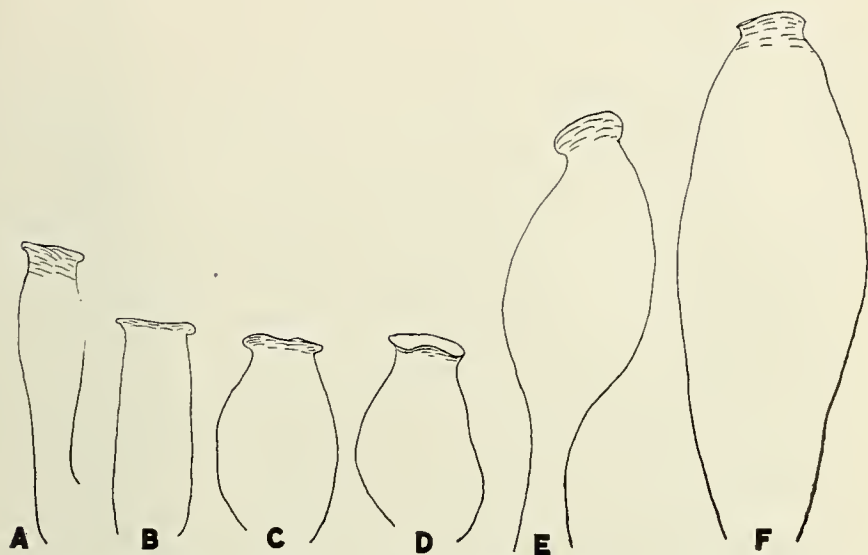


Fig. 45. *Melanoxantherium* cornicles all drawn to the same scale. A, *bicolor*, alate viviparous; B, *salicti*, alate viviparous; C and D, *smithiac*, alate and apterous viviparous; E, *antennatum* apterous oviparous; F, *salicis* apterous viviparous.



Fig. 43. Antennae of *Melanoxanthium*, all drawn to the same scale. A, *bicolor*, alate viviparous; B, *salicis*, alate viviparous; C, *smithiae*, alate viviparous; D, *autumnatum*, apterous oviparous; E, *salicis*, alate viviparous; F, *salicis*, apterous viviparous.

APHID CONTROL.

Shade or ornamental trees can be protected frequently from serious aphid attacks by keeping watch from year to year. This is especially desirable while trees are young. Later it is more difficult, but the damage is not usually as serious on large well established trees.

From small or isolated trees the galls of gall forming species can sometimes be collected by hand before the aphides leave them, thus lessening the trouble in that vicinity for another year.

Species inhabiting the trunk of large branches can be destroyed in great numbers by using a brush dipped in any of the spray solutions ordinarily used for aphides.

Tips of branches bearing leaves which have been curled by aphides can be dipped into a tobacco decoction long enough for the solution to penetrate. Such a method as this is of course only applicable for a few treasured plants or small trees.

In recent years tobacco extracts have rapidly taken the place of other sprays for aphides, and well informed apple growers are using them almost to the exclusion of other insecticides. It should be remembered that this is a contact insecticide and kills only the insects actually touched. It is, therefore, necessary to be very thorough in the spraying

Formula—Tobacco Decoction.

Tobacco stems or tobacco dust..... 2 pounds.

Water 4 gallons.

Put the tobacco in the water, enough to cover, which may be either cold or hot. Place over the fire and when the water has reached the boiling point, remove some of the fire and allow the water to simply *simmer* for fully one hour, when the liquid is ready to be drained off, diluted to the above proportions and applied. Boiling violently drives off the nicotine.

If whole-leaf tobacco is used, prepare as above, using one pound of tobacco to each four gallons of water.

No lime or other alkaline substance should be added to the tobacco *while cooking*. Apply at once or within a few days after making, if possible.

Certain reliable extracts such as "*Black Leaf*," "*Black Leaf 40*," and "*Nikoteen*" are on the market and can be secured through local druggists. The Black Leaf preparations are manufactured by *The Kentucky Tobacco Product Company*, Louisville, Ky., and are carried by the Collins Hardware Company, 97 Friend St., Boston, Mass. *Nikoteen* is manufactured by The Nicotine Manufacturing Company, St. Louis, Mo., and can be secured from Joseph Brick & Sons, 47-54 N. Market St., Boston, Mass.

Directions for use come with the products. There is nothing to do in the preparation of these extracts except to stir the contents of the can before pouring out any quantity for dilution. In most cases one gallon of the *Black Leaf* will be found sufficient for each seventy gallons of water. But if in the treatment of any louse this does not seem sufficient it may be used in proportion of one gallon to sixty or sixty-five gallons of water. Careful sprayers have usually succeeded in killing plant lice with this preparation in the proportion of one gallon to each one hundred gallons of water. Thoroughness of application is of as much importance as the strength of the material used.

Nikoteen is a more concentrated abstract, 1 part being used with from 400 to 600 parts of water.

Black Leaf 40 is a concentrated solution of nicotine-sulphate and is widely and successfully used in large western orchards, at the rate of 1 part to 700 or 800 parts of water.

It is the common practice to add soap,—whale oil soap or good laundry soap at the rate of 2 bars to 50 gallons. This is to lessen the formation of drops, causing the spray to cover surfaces more in the form of a thin film.

Better success is obtained by some by using a little lime instead of soap, the inert solid in suspension aiding the extract to "wet" and "stick" to the bodies of the aphids. For this purpose 1 pound of stone lime, slaked and strained into 50 gallons of tobacco extract as prepared for application, is sufficient.

When other plant enemies besides aphids are present "Combination sprays" are frequently successfully applied. Self-boiled lime-sulphur (8-8-50 cold) may be used adding 1-70 of its volume of *Black Leaf*. On the same basis *Black Leaf* may be combined with Bordeaux (5-5-50) or with lead arsenate or with both together when foes combine against one kind of plant.



Fig. 46. A, *Pemphigus gravicornis*; B, *P. bursarius*; C, *P. conduplifolius*; D, *P. populimonilis*; E, *C. viminalis*? G, *Mac. laevigatae*; F, *Aphis dorsalis*; H, *P. gravicornis*; I, *P. populicaulis*; J, *Melanoxantherium salicis*; K, *C. populicola*; L, *A. salicicola*.

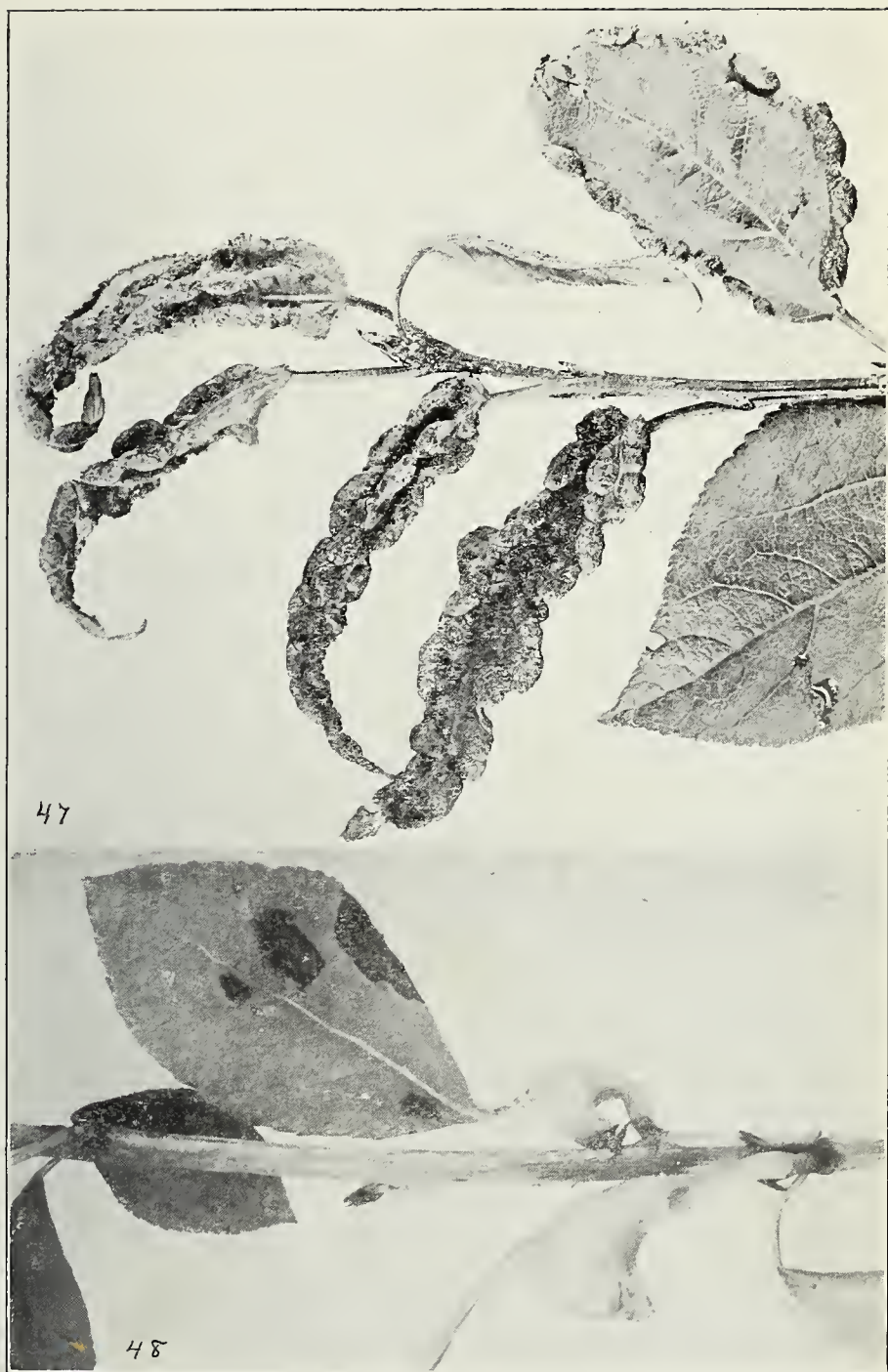
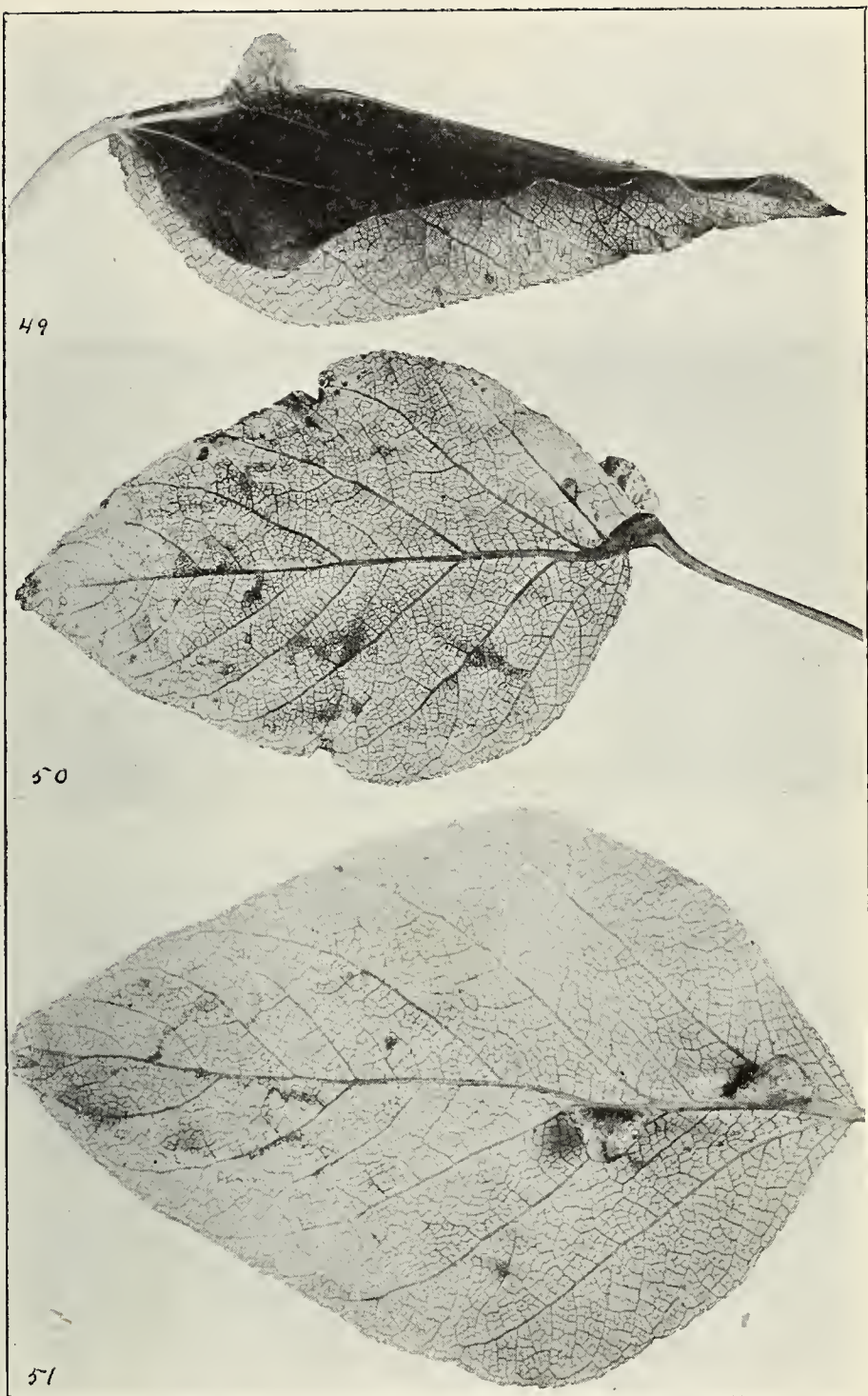


Fig. 47. *P. populimonilis*. Galls collected at Veazie, Maine, July 27, 1909.
Fig. 48. *P. bursarius*. Galls collected at Orono, July 12, 1911.



Figs. 49-51. Galls of *Pemphigus populicaulis*.



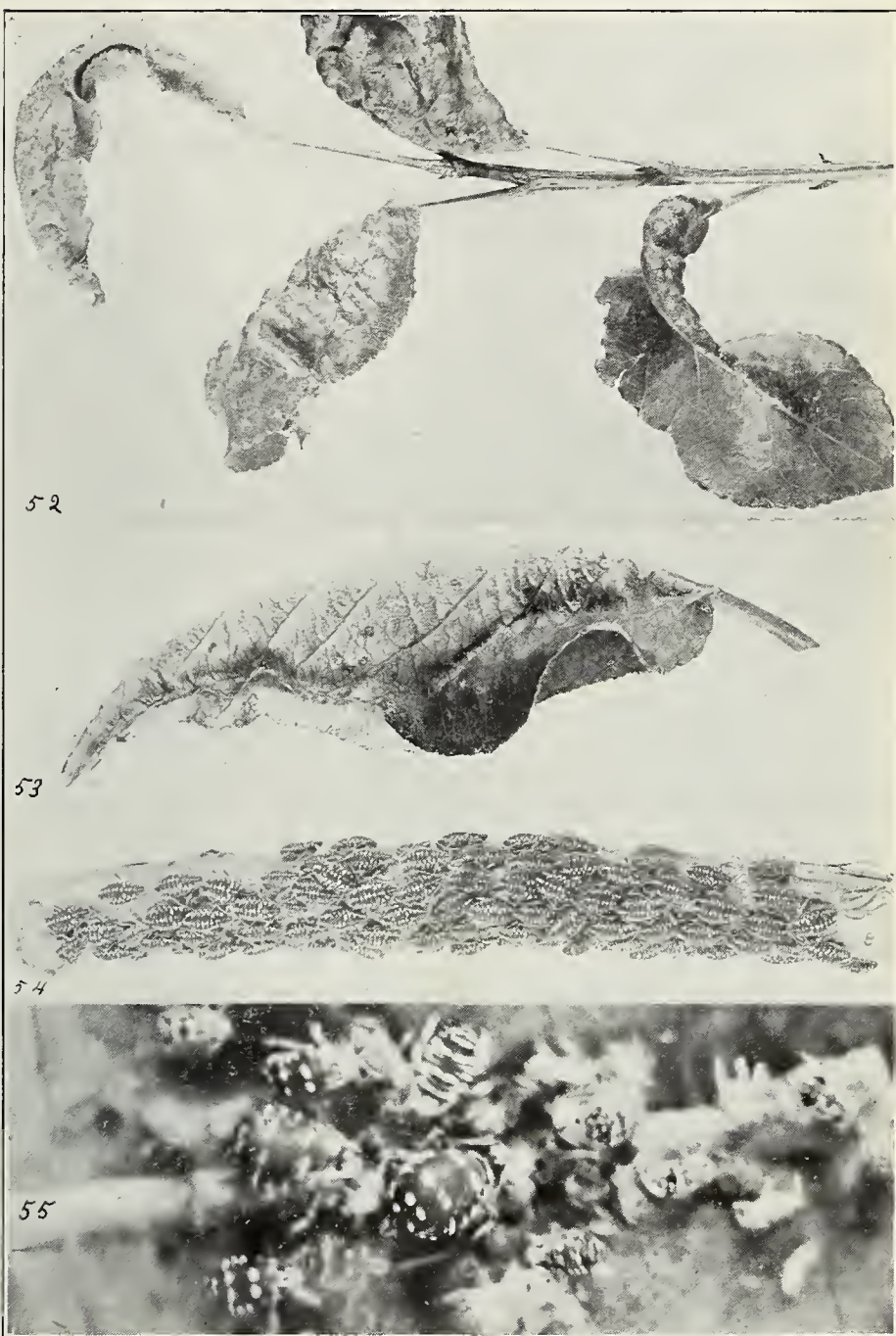


Fig. 52. *P. populiconduplifolius*. Galls collected at Orono, July 15, 1912.
 Fig. 53. *P. gravicornis*. Galls collected at Orono, July 7, 1911.
 Fig. 54. *Melanoxantherium salicis*. Collection made at Orono, May 16, 1910.
 Fig. 55. *Aphis populifoliae*. Collection made at Veazie, July 18, 1912.

FOOD PLANT CATALOGUE OF THE APHIDAE OF THE
WORLD.

PART II.*

EDITH M. PATCH.

SALICACEAE. WILLOW FAMILY.

POPULUS. Poplar. Aspen.

- P. alba** L. (canescens). White Poplar, Silver-leaved Poplar.
Chaitophorus populi (Linn.) Pass. (Myzaegirus Amyot),
(Arctaphis populi Walker). Buckton, 2, p. 142.
Cladobius populae Kalt. (Aphis) Macchiati, 1883, p. 260.
Guercioja populi Del Guercio. Mordwilko, 1908, p. 361 (9).
Lachnus longirostris Fab? Passerini, 1860, p. 38.
Lachnus longirostris Fab. Kaltenbach, 1874, p. 92.
Lachnus longirostris Pass. Kaltenbach, 1874, p. 562.
Pachypappa vesicalis Koch. Cholodkovsky, 1901, p. 293.
Schizoneura tremulae DeGeer. Kaltenbach, 1874, p. 561.
- P. angustifolia** James (laevigata).
Chaitophorus populicola Thomas. Hunter, 1901, p. 88.
Pemphigus populi-monilis Riley. Cowen, 1895, p. 116.
- P. balsamifera** L. Balsam Poplar, Tacamahac (1911).
Aphis populifoliae Davis, 1910. Patch, 1913, Bul. 213, p. 82.
Chaitophorus populicola Thomas. Patch, 1913, Bul. 213, p. 78.
Melanoxantharium bicolor Oestlund. Patch, 1913, Bul. 213, p. 85.
Pemphigus balsamiferae Williams. Williams, 1910 (1911), p. 8.
Pemphigus gravicornis Patch. Patch, 1913, Bul. 213, p. 75.
Pemphigus popularius Fitch. Jackson, 1908, p. 191.
Pemphigus populicaulis Fitch. Jackson, 1908, p. 193.
Pemphigus populiconduplifolius Cowen. Gillette, 1909a, p. 355.
Patch, 1913, Bul. 213, p. 76.
Pemphigus populiglobuli Fitch. Jackson, 1908, p. 197.
Pemphigus populimonilis Riley. Essig, 1912, p. 707. Patch, 1913,
Bul. 213, p. 73.
Pemphigus populiramulorum Riley. Jackson, 1908, p. 209.
Pemphigus populitransversus Riley. Jackson, 1908, p. 207.
Pemphigus populivenae Fitch. Jackson, 1908, p. 195.
Stagona vesicalis Rudow. Rudow, 1875, p. 249.

* Papers from the Maine Agricultural Experiment Station: Entomology No. 66. For Part I see Bulletin 202.

P. berolinensis.

Pemphigus bursarius L. (lactucarius Pass) (pyriformis Licht.)
Tullgren, 1909, p. 122.

P. canadensis.

Pemphigus filaginis Boyer. (gnaphalii Kalt) (prociphilus gnaphalii Koch) (Pachypappa marsupialis Koch) (ovato-oblongus Kessler). Tullgren, 1909, p. 136.

P. candicans Ait. Balm-of-Gilead.

Aphis candicans Fitch. Monell, 1879, p. 26.

Chaitophorus candicans Thomas. Hunter, 1901, p. 87.

Melanoxanthus salicis Linn. Cowen. 1895, p. 117.

P. deltoides Marsh. (monilifera) (angulata) Cotton-wood, Necklace Poplar.

Arctaphis sp. Cooley, 1912, p. 89. "New Aphis of Cottonwoods."

Chaitophorus populicola Thomas. 1879, p. 104.

Chaitophorus populifolia Fitch (stevensis Sanborn). Sanborn, 1904, p. 36 and 1906, p. 225.

Chaitophorus populifoliae (Fitch). Hunter, 1901, p. 88.

Melanoxanthium salicti Harris. Weed, 1891, p. 290.

Pemphigus betae Doane. Gillette, 1912, (24th Rept. Exp. Sta.) p. 28. "On Cottonwood."

Pemphigus bursarius Linn? Patch, 1913, Bul. 213, p. 78.

Pemphigus oestlundii Cockerell, 1906, p. 34.

Pemphigus populicaulis Fitch. Sanborn, 1904, p. 20.

Pemphigus populicaulis Fitch. Jackson, 1908, p. 193.

Pemphigus populiconduplifolius Cowen. Jackson, 1908, p. 217.

Pemphigus populitransversus Riley. Sanborn, 1904, p. 22.

Pemphigus populitransversus Riley. Jackson, 1908, p. 207.

Pemphigus pseudobyrsa Walsh. Jackson, 1908, p. 199.

Phylloxera popularia Pergande. Pergande, 1904b, p. 266.

(In galls of *Pemphigus transversus* Riley).

Phylloxera prolifera Oestlund. Oestlund, 1887, p. 17. (In galls of *Pemphigus populicaulis* Fitch).

P. Fremonti S. Wats.

Chaitophorus populicola Thomas. Williams, 1891, p. 9.

Melanoxanthus salicti (Harris). Williams, 1891, p. 9.

Mordwilkoja oestlundii (Cockerell) (*Pemphigus vagabundus* Walsh) Davis, 1911, p. 4.

Pemphigus populicaulis Fitch. Williams, 1891, p. 9.

Pemphigus populimonilis Riley. Davidson, 1910, p. 374.

Pemphigus populiramulorum Riley. Jackson, 1908, p. 209.

Pemphigus populitransversus Riley. Williams, 1891, p. 9.

Pemphigus pseudobyrsa (Walsh). Williams, 1891, p. 9.

Phylloxera prolifera Oestlund. Williams, 1891, p. 9.

Thomasia populifoliae (Fitch). Essig, 1912a, p. 716.

P. grandidentata Michx. Large-toothed Aspen.

Aphis populifoliae Fitch. Thomas, 1879, p. 102.

Aphis (*Dactynus*) *populus-grandidentata* Raf. Rafinesque, 1818.

Chaitophorus populi (Linn). Hunter, 1901, p. 88.

Chaitophorus populifoliae (Fitch) " = *C. populi* (Linn.) ?" Oestlund, 1887, p. 39.

P. nigra L. Black Poplar.

Anuraphis populi Del Guercio. Del Guercio, 1909 (1910). Redia VII, p. 298.

Aphis populi L. Kaltenbach, 1874, p. 561.

Chaitophorus leucomelas Koch. Passerini, 1863, p. 58.

Chaitophorus leucomelas Koch., Pass. Buckton, 2, p. 135.

Chaitophorus lyratus Ferrari. Del Guercio, 1900, p. 119.

Chaitophorus nassonowi Mordwilko. Mordwilko, 1899, p. 410.

Chaitophorus populi (Linn) Pass. (*Myzaegirus Amyot*) (*Arctaphis populi* Walker). Buckton, 2, p. 142.

Chaitophorus versicolor Koch (*Aphis populi* var. Kalt) Ferrari, 1872, p. 76.

Lachnus viminalis Boyer. (*Aphis*). Ferrari, 1872, p. 80.

Pemphigus affinis Kalt. (*Thecabius populneus* Koch). Passerini, 1863, p. 74.

Pemphigus bursarius (L.) Kalt. Kaltenbach, 1874, p. 561.

Pemphigus bursarius Hartig. (*Eriosoma populi* Mosley) (*Aphioides bursaria* Rondani). Buckton, 3, p. 118.

Pemphigus filaginis Boyer (*gnaphalii* Kalt.) (*Prociphilus gnaphalii* Koch) (*Pachypappa marsupialis* Koch). (ovato-oblongus Kessler). Tullgren, 1909, p. 136.

Pemphigus spirothecae Koch (*affinis* Koch) (*Puceron de peuplier* Reaumur). Buckton, 3, p. 122.

Pemphigus spyrothecae Pass. Passerini, 1860, p. 39.

Pemphigus tortuosus Rudow. Rudow, 1875, p. 248.

Pemphigus vesicarius Pass. Passerini, 1863, p. 76.

Stomaphis bobretskyi Mordwilko. Mordwilko, 1899, p. 411.

Stomaphis longirostris (Fab.). Del Guercio, 1907 (1908) Redia V, p. 344.

Thecabius populneus Koch. Koch, p. 295.

Thecabius populneus Koch. Kaltenbach, 1874, p. 562.

P. pyramidalis Salisb. (*italica* Duroi) (*dilatata*). Lombardy Poplar.

Chaitophorus leucomelas Koch. Kessler, 1882, p. 37.

Chaitophorus nassonowi Mordwilko. Mordwilko, 1899, p. 410.

Chaitophorus populeus (Kalt.) (*Lachnus punctatus* Burm?) (*Cladobius populeus* Koch). Buckton, 2, p. 137.

Chaitophorus populi (Linn). Pass. (*Myzaegirus Amyot*) (*Arctaphis populi* Walker). Buckton, 2, p. 142.

Cladobius populea Kalt. (*Aphis*.) Ferrari, 1872, p. 76.

Drepanosiphum smaragdinum Koch. Koch, p. 205.

Drepanosiphum (Aphis) tiliae Koch. Kaltenbach, 1874, p. 561.

Pemphigus affinis Kalt. Kaltenbach, 1874, p. 561.

Pemphigus bursarius Linn. Reaum (*Aphis*). Ferrari, 1872, p. 83.

Pemphigus bursarius Hartig (*Eriosoma populi* Mosley) (*Aphioides bursaria* Rondani). Buckton, 3, p. 118.

Pemphigus filaginis Boy de Fonsc. (*gnaphalii* Kalt.) (*Prociophilus gnaphalii* Koch.) (*Pachypappa marsupialis* Koch) (*ovato-oblongus* Kessler). Tullgren, 1909, p. 136.

Pemphigus glandiformis Rudow. Rudow, 1875, p. 247.

Pemphigus populicaulis Fitch. Jackson, 1908, p. 193.

Pemphigus protospirae Licht. Tullgren, 1909, p. 155.

Pemphigus spirothecae Pass. (*affinis* Koch). Tullgren, 1909, p. 161.

P. tremula L.

Aphis populi tremulae Ascanius. Hagen, p. 449.

Asiphum populi (Fab.) Koch. Koch, p. 246.

Asiphum tremulae DG. Tullgren, 1909, p. 66.

Chaitophorus populi (Linn.) Pass. (*Myzaegirus Amyot*) (*Arctaphis populi* Walker). Buckton, 2, p. 142.

Chaitophorus populi (Linn.) (*Ch. tremulae* Koch). Koch, p. 9.

Chaitophorus versicolor Koch. Passerini Flora.

Pachypappa lactea Tull. Tullgren, 1909, p. 72.

P. tremuloides Michx. (*trepida*). American aspen.

Aphis populifoliae Davis, 1910. Patch, 1913, Bul. 213, p. 82.

Aphis (*Dactynus*) *populus-trepida* Raf. Rafinesque, 1818.

Chaitophorus bruneri Williams. Williams, 1910. (1911), p. 26.

Chaitophorus delicata Patch. Patch, 1913, Bul. 213, p. 80.

Chaitophorus populicola Thomas. Gillette, 1909a, p. 388. Patch, 1913, Bul. 213, p. 78.

Cladobius beulahensis Cockerell. Cockerell, 1904, p. 263.

Pemphigus populicaulis Fitch. Hunter, 1901, p. 78.

Pemphigus? *rileyi* Stebbins. Stebbins, 1910, p. 9.

P. trichocarpa Torr. & Gray.

Chaitophorus populicola Thos. (?). Essig, 1909, p. 98.

Chaitophorus salicicola Essig. Essig, 1911b, p. 534.

Eichochaitophorus populifolii Essig. Essig, 1912a, p. 715.

Pemphigus populicaulis Fitch. Essig, 1912a, p. 712.

Pemphigus populimonilis Riley. Gillette, 1909a, p. 356.

Pemphigus populitransversus Riley. Davidson, 1910, p. 372.

P. sp.

Aphis populi-albae Boyer. Lichtenstein, La Flore.

Byrsocrypta vagabunda Walsh. Walsh, 1862, p. 306. (migrants "on various forest trees").

Chaitophorus albus Mordwilko. Mordwilko, 1899 (1901), p. 410.

Chaitophorus populifoliae Fitch. Davidson, 1910, p. 375.

Cladobius longirostris Mordwilko. Mordwilko, 1899. (1901), p. 414.

Cladobius rufulus Davidson. Davidson, 1910, p. 375.

Lachnus longistigma Monell. Sanborn, 1904, p. 31.

Pemphigus borealis Tullgren. Tullgren, 1909, p. 146.

Pemphigus immunis Buckton. Buckton, 1896, p. 51.

Pemphigus infaustus Ferrari. Lichtenstein, 1885 ("var. de *P. spirothecae* Pass.").

- Pemphigus lichtensteini* Tull. Tullgren 1909, p. 151.
Pemphigus napaecus Buckton. Buckton, 1896, p. 50.
Pemphigus oestlundii Cockerell. (*P. vagabundus* (Walsh) of authors). Oestlund, 1887, p. 22. Cockerell, 1906, p. 34.
Pemphigus populi Courcelet. Courcelet, 1881, p. 46.
Pemphigus populicaulis Fitch (*betæ* Doane?). Clarke, 1903, p. 248.
Pemphigus spiriformis Licht. Zoölogical Record, 1886, p. 319 (misprint for pyriformis).
Pemphigus tortuosus Rudow. Lichtenstein, La Flore.
Pemphigus varsoviensis Mordwilko. Mordwilko, 1899, p. 411.
Schizoneura passerinii Signoret. Lichtenstein, La Flore.
Schizoneura populi Gillette. Gillette, 1901, p. 1.
Thecabius (*Pemphigus*) *affinis* Kalt. (*ranunculi* Kalt.). Tullgren, 1909, p. 110.

SALIX. Willow.

S. acuminata.

Lachnus viminalis (Boyer) Pass. (*salicis* Shaw?) (*salicis* Curtis?) (*saligna* Walker). Buckton, 3, p. 57.

S. alba L. (vitellina) White Willow.

- Aphis populea* Kalt. (*Lachnus punctatus* Burmeister). Kaltenbach, 1843, p. 117.
Aphis populea Kalt. Kaltenbach, 1874, p. 561.
Aphis salicis Linn. Kaltenbach, 1874, p. 586.
Chaitophorus saliceti Schrank (*Aphis*). Macchiati, 1883, p. 261.
Chaitophorus salicti Schrank (*Aphis*). Ferrari, 1872, p. 77.
Chaitophorus smithiae Monell. Monell, 1879, p. 32.
Chaitophorus viminalis Monell (?). Weed, 1888, p. 133.
Chaitophorus vitellinae Schrank (*Aphis*). Ferrari, 1872, p. 76.
Cladobius populae Kalt (*Aphis*). Macchiati, 1883, p. 260.
Cladobius steinheili Mordwilko. Mordwilko, 1899, p. 350. (? on *Salix alba*).
Lachnus longirostris Fab? (*Aphis*). Ferrari, 1872, p. 81.
Lachnus longirostris Fab. Kaltenbach, 1874, p. 92.
Lachnus longirostris Pass. Kaltenbach, 1874, p. 562.
Lachnus viminalis Boyer. Kaltenbach, 1874, p. 585. Del Guercio, 1907 (1908). Redia V, p. 345.
Melanoxanthus salicis (Linn.). Williams, 1891, p. 27.
Melanoxanthus smithiae Monell. Williams, 1891, p. 27.
Myzus ribis Linn. et auct (*Aphis*). Ferrari, 1872, p. 62.
Siphocoryne capreae (Fab.) Pass. (*pastinacae* L.) (*A. aegopodii* Scop) (*R. capreae* Koch) (*R. cicutae* Koch) (*A. umbellatarum* Koch). Passerini, 1863, p. 52.
Stomaphis longirostris (Fab.) (*Aphis* Fab.) (*Phylloxera* Boyer) (*Lachnus* Passerini) Del Guercio, 1907 (1908) Redia V, pp. 259, 344.

- S. amygdaloides** Anders. Peach-leaved Willow.
Aphis salicicola (Thomas). Cowen, 1895, p. 121.
- S. babylonica** L. (annularis) Weeping Willow.
Aphis capreae Fab. (*A. aegopodii* Scop.). Kaltenbach, 1843, p. 109.
Aphis saliceti Kalt. Passerini, 1863, p. 37.
Aphis vitellinae Schrank. Kaltenbach, 1874, p. 585.
Chaitophorus viminalis Monell (?). Weed, 1888, p. 133.
Rhopalosiphum salicis Monell. Monell, 1879, p. 27.
- S. laevigata** Bebb.
Chaitophorus salicicola Essig. Essig, 1911b, p. 534.
Fullawaya saliciradicis Essig. Essig, 1912a, p. 716.
Macrosiphum laevigatae Essig. Essig, 1911b, p. 549.
Micrella monelli Essig. Essig, 1912a, p. 715.
Symdobiis salicicorticis Essig. Essig, 1912a, p. 715.
- S. lapponum** L.
Chaetophorus salicivorus Passerini. Schouteden, 1906a, p. 213.
- S. lasiolepis** Benth.
Micrella monelli Essig. Essig, 1912a, p. 715.
- S. longifolia** M. (interior) Sand Bar Willow.
Chaitophorus nigrae Oestlund. Cowen, 1895, p. 117.
Melanoxanthus salicis (Linn.). Williams, 1891, p. 27.
- S. lucida** Muhl. Shining Willow.
Chaitophorus viminalis Monell (?). Weed, 1888, p. 133.
Melanoxanthus salicis (Linn.). Williams, 1891, p. 27.
Siphocoryne (*Rhopalosiphum*) *salicis* (Monell). Oestlund, 1887, p. 70.
- S. macrostachya** Nutt.
Symdobiis macrostachyae Essig. Essig, 1912a, p. 715.
Thomasia crucis Essig. Essig, 1912a, p. 716.
- S. nigra** Marsh. Black Willow.
Chaitophorus nigrae Oestlund. Oestlund, 1887, p. 40.
Rhopalosiphum salicis Monell. Monell, 1879, p. 27.
- S. nigricans** Sm.
Chaitophorus capreae Koch. Buckton, 2, p. 136.
Chaitophorus salicti (Schrank) Pass. Passerini, 1863, p. 60.
Cladobius populea (Kalt.) Koch. Passerini, 1863, p. 56.
- S. purpurea** L. Purple Willow.
Chaitophorus salicivora Walker? Passerini, 1860, p. 37.
Chaitophorus salicivora Pass. (*salicivora* Walker?) Passerini, 1863, p. 58.
Lachnus viminalis Boyer. Kaltenbach, 1874, p. 585.
- S. repens** L.
Chaitophorus hypogaeus Del Guercio. Schouteden, 1906, p. 213.
- S. caprea** L.
Aphis alterna Walker. Walker, 1849c, p. 43.
Aphis capreae Fab. (*A. aegopodii* Scop.) Kaltenbach, 1843, p. 109.

Aphis populea Kalt. (*Lachnus punctatus* Burmeister). Kaltenbach, 1843, p. 117.

Aphis saliceti Kalt. Buckton, 2, p. 53.

Aphis salicis Linn. Kaltenbach, 1874, p. 586.

Aphis secunda Walker. Walker, 1849c, p. 44.

Chaitophorus capreae Koch. Buckton, 2, p. 137.

Chaitophorus salicivorus (Walker) Pass. Buckton, 2, p. 135.

Lachnus viminalis Boyer. Kaltenbach, 1874, p. 585. Del Guercio 1907 (1908) Redia V, p. 345.

S. cinerea L.

Aphis saliceti Kalt. Del Guercio, 1909 (1910) Redia VII, p. 297.

Chaetophorus salicivorus Passerini. Schouteden, 1906a, p. 213.

Chaetophorus salicti Schrank. Schouteden, 1906a, p. 213.

Lachnus viminalis (Boyer) (*Aphis saligna* Sulzer, Walker, p. 959). (*A. salicina* Zett.) (*A. salicis* Curtis) (*Lachnus dentatus* Le Baron) Del Guercio, 1907 (1908) Redia V, p. 345.

Melanoxanthium sp. Schouteden, 1906a, p. 215.

S cordata Muhl.

Chaitophorus cordatae Williams. Williams, 1910 (1911), p. 27.

Chaitophorus viminalis Monell. Williams, 1910 (1911), p. 30.

S daphnoides Vill.

Lachnus viminalis (Boyer) Pass. (*salicis* Shaw?) (*salicis* Curtis?) (*saligna* Walker). Buckton, 3, p. 57.

S discolor Muhl. Glaucous Willow.

Aphis (*Siphonophora*) *salicicola* (Thomas) Monell. Oestlund, 1887, p. 63.

S fragilis L. (Russelliana). Crack Willow.

Aphis vitellinae Schrank. Kaltenbach, 1874, p. 585.

Lachnus viminalis Boyer. Kaltenbach, 1874, p. 585.

S. glaucophylla.

Chaitophorus n. sp. Sanborn. Sanborn, 1904, p. 34.

S. speciosa.

Aphis spectabilis Ferrari. Ferrari, 1872, p. 64.

S triandra L.

Aphis vitellinae Schrank. Kaltenbach, 1874, p. 585.

S viminalis L. Osier.

Aphis saliceti Kalt. Ferrari, 1872, p. 64. Del Guercio, Redia VIII, p. 297.

Aphis salicti Kalt. Theobald, 1911-12.

Cladobius populea (Kalt.) Koch. Passerini, 1863, p. 56.

Lachnus longirostris Fab.? (*Aphis*). Ferrari, 1872, p. 81.

Lachnus viminalis (Boyer) Pass. (*A. saligna* Walker?). Passerini, 1869, p. 64. (*dentatus* Le Baron) Del Guercio, 1907 (1908), Redia V, pp. 281, 345.

Melanoxanthus salicis (Linn.). Buckton, 2, p. 23.

S. vitellina L.

Aphis populea Kalt. Kaltenbach, 1874, p. 561.

Cladobius populea (Kalt.) Koch. Passerini, 1863, p. 56.

Lachnus longirostris Fab. Kaltenbach, 1874, p. 92.

Lachnus longirostris Pass. Kaltenbach, 1874, p. 562.

S. sp.

Aphis amenticola Kalt. Kaltenbach, 1874, p. 586.

Aphis cicutae Koch. (capreae Fab.) Kaltenbach, 1874, p. 585.

Aphis gracilis Walker. Walker, 1852, p. 1040.

Aphis saliceti Kalt. Kaltenbach, 1874, p. 585.

Aphis saliceti Schrank. Kaltenbach, 1874, p. 586.

Aphis salicicola (Thomas) Monell (*A. brevifurca* Monell MSS)
Monell, 1879, p. 24.

Aphis salicicola Thomas. Gillette, 1910, p. 403.

Aphis salicina Zetterstedt. (Chaitophorus?) Tullgren, 1909, p. 6.

Aphis pilosa Haldeman (*A. salicis*?) Hunter, 1901, p. 102.

Aphis spectabilis Ferrari (? *amenticola* Kaltenbach). Schouteden, 1906a, p. 228.

Aphis truncata Hausmann. Lichtenstein. La Flore.

Chaitophorus populeus (Kalt.) (*Lachnus punctatus* Burm?)
Buckton, 2, p. 139.

Chaitophorus salicicola Monell. (*Lachnus salicicola* Uhler?)
Thomas, 1879, p. 105.

Chaitophorus salicis Williams. Williams, 1891, p. 27.

Chaitophorus viminalis Monell. Patch, 1913, Bul. 213, p. 80.

Chaitophorus sp. Davidson, 1909, p. 301.

Cladobius rufulus Davidson. Davidson, 1909, p. 300.

Lachnus dentatus Le Baron. Weed, 1890, p. 117.

Lachnus salicellis Fitch (*L. salicicola* Harris?). Thomas, 1879,
p. 119.

Lachnus saligna Walker. Lichtenstein. La Flore.

Lachnus viminalis (Boyer) (*L. dentatus* Le Baron). Oestlund,
1887, p. 32.

Macrosiphum laevigatae Essig. Patch, 1913, Bul. 213, p. 84.

Melanoxantherium antennatum Patch. Patch, 1913, Bul. 213, p.

Melanoxanthus bicolor Oestlund. Weed, 1891, p. 290.

Melanoxantherium flocculosum (Weed). Gillette, 1909a, p. 385.

Melanoxantherium salicis (Linn.). Gillette, 1909a, p. 387; Patch,
1913, Bul. 213, p. 88.

Melanoxantherium saliceti Harris. Patch, 1913, Bul. 213, p. 86.

Melanoxanthus salicis (Linn.). Weed, 1890, p. 115.

Melanoxanthus smithiae (Monell). Gillette, 1909a, p. 387; Patch,
1913, Bul. 213, p. 86.

Myzus achyranthes Monell. Sanborn, 1904, p. 71.

Myzus persicae Sulzer. Gillette and Taylor, 1908, p. 35.

Nectarophora californica Clarke. Clarke, 1903, p. 254.

Phylloxera salicicola Pergande. Pergande, 1904b, p. 269.

Phylloxera salicis (Licht.) CB. Börner, 1909b, p. 60.

Pterocomma pilosa Buckton. Buckton, 2, p. 144.

Siphocoryne acgopodii Scopoli. Lichtenstein. La Flore.

Siphocoryne salicis Monell. Weed, 1893, p. 297.

Siphonophora salicicola Thomas. Thomas, 1879, p. 193.

